Remarks/Arguments

The present amendment is made in response to the Current Office Action. Upon entry of the amendment, claims 11-21 will be pending. This amendment amends claim(s) 1, 17 and 19-21. Exemplary support for these claim amendments is in the specification (as originally filed) at Paragraph 0031 and Figure 6.

Claim Rejections – 35 USC § 112

The Current Office Action rejects claim 17 on the grounds of 35 USC 112, paragraph 2, definiteness due to an antecedent basis issue. Claim 17 has been amended to correct the issue helpfully noted by the Examiner.

Claim Rejections – Anticipation -- 35 USC § 102

The Current Office Action rejects claims 11-15 and 18-21 on 35 U.S.C. §102 anticipation grounds based on US patent 4,135,027 ("Anthony"). This rejection is respectfully traversed in part. In part, claims 11 and 19-21 have been amended to even more clearly define over Anthony.

A. Background Technology

When a photon of electromagnetic energy passes into a layer of material, there are two possible things that may ultimately happen to it: (i) it may be absorbed; or (ii) it may be transmitted (for example, straight through transmission, refractive transmission, diffuse transmission). ***"Absorption"*** means that the photon of electromagnetic energy is taken out by the matter in the layer of material and transformed to another form of energy, such as heat. (See, http://en.wikipedia.org/wiki/Absorption_(electromagnetic_radiation).) ***"Transmission"*** means that the photon of electromagnetic energy ***passes out of the material*** without having it energy taken by the material of the layer. (See, http://en.wikipedia.org/wiki/Transmittance.) In other words, if the photon is absorbed, then it is not transmitted; and if the photon is transmitted, then it is not absorbed. This is an either-or choice at the level of the single photon of electromagnetic energy.

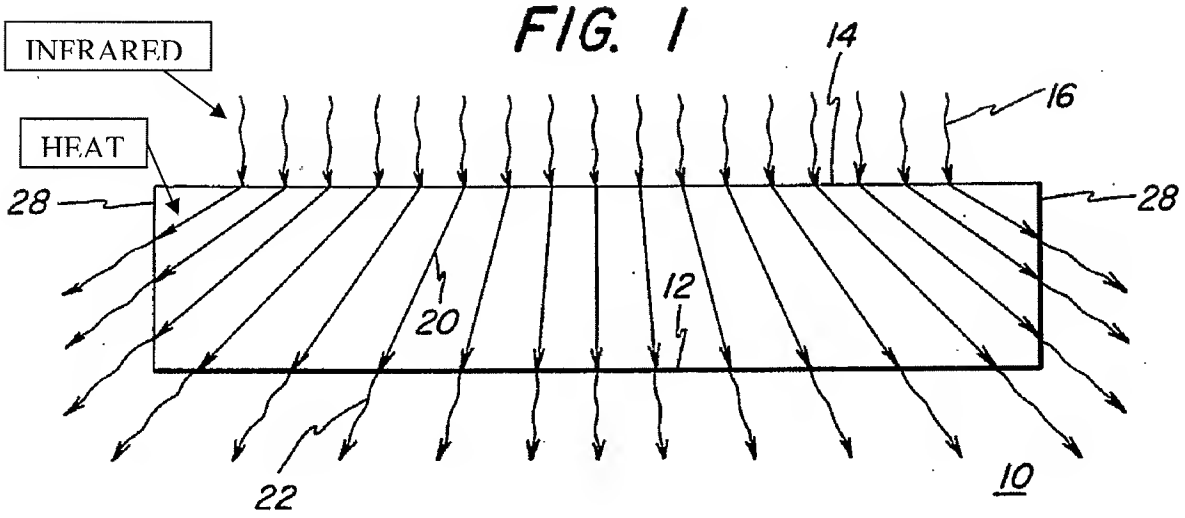
However, electromagnetic energy (such as infrared wavelength electromagnetic energy) is usually made up of many, many, many photons. When a certain material receives many, many, many photons of a given type of electromagnetic energy, then three alternative outcomes are possible: (i) the material may transmit substantially all of the photons and is called "highly transparent;" (ii) the material may absorb substantially all of the photons and is called "opaque;" ***or*** (iii) the material may absorb a substantial number of the photons while letting a substantial number of photons to pass through. (See, http://en.wikipedia.org/wiki/Opacity_(optics); and http://en.wikipedia.org/wiki/Transparent_materials). Whether a material, receiving a given range of wavelengths of radiant energy, will be considered highly transparent, opaque, or somewhere in between will depend on the thickness and chemical composition of the material, as well as upon the specific range of wavelengths (for example, wavelengths of the infrared range) of the incident electromagnetic radiation.

This background is important to understand because the primary piece of cited art discloses an opaque layer, which is outside the scope of the present claims, even when these claims are given their broadest reasonable interpretation, because the claims require that substantial infrared energy be transmitted, which the opaque piece of prior art cannot do. This point will be discussed in greater detail below.

B. Anthony Is Opaque and Does Not Transmit Infrared

Anthony discloses a system and method where a semiconductor wafer is exposed to infrared radiation to form thermal gradients in order to cause "zone melting" and thereby distribute dopant material within the volume of the semiconductor material. Anthony starts its discussion by describing an embodiment, shown in Figure 1 of Anthony, which is prior art with respect to Anthony itself (and prior art with respect to the present application, as well). As shown in Figure 1 of Anthony and discussed in the Background Of The Invention section of Anthony, infrared radiation is directed at a top surface 14 of the semiconductor wafer 10. As the infrared radiation enters the material, it is absorbed and turns into heat. This heat energy, which is not infrared radiation, is transmitted through the interior volume of the semiconductor wafer. When the heat reaches the other surfaces 12, 28 of the wafer, the heat is converted back into infrared radiation and re-radiated away from the wafer. (See Anthony at col. 2, ll. 23-35.) Anthony not only explains in words the energy conversions from absorbed infrared radiation to

heat and from heat back into infrared radiation, but it also uses a clever graphical way of showing these transformations in Figure 1:



(Notations added.) More particularly: (i) when the energy is in the form of infrared radiation, it is shown in Anthony's figures as a squiggly arrow; and (ii) when the energy is in the form of heat, it is shown in Anthony's Figures as a straight line arrow. Because no squiggly arrows pass through wafer 10 in Figure 1 of Anthony, this means that ***wafer 10 is opaque*** with respect to the infrared radiation and absorbs it all and converts it all to heat. This means that wafer 10 of Anthony ***does not transmit infrared radiation***.

Moving to a somewhat more complex embodiment in Anthony, the rejections of the Current Office Action focus on the Figure 5 embodiment of Anthony:

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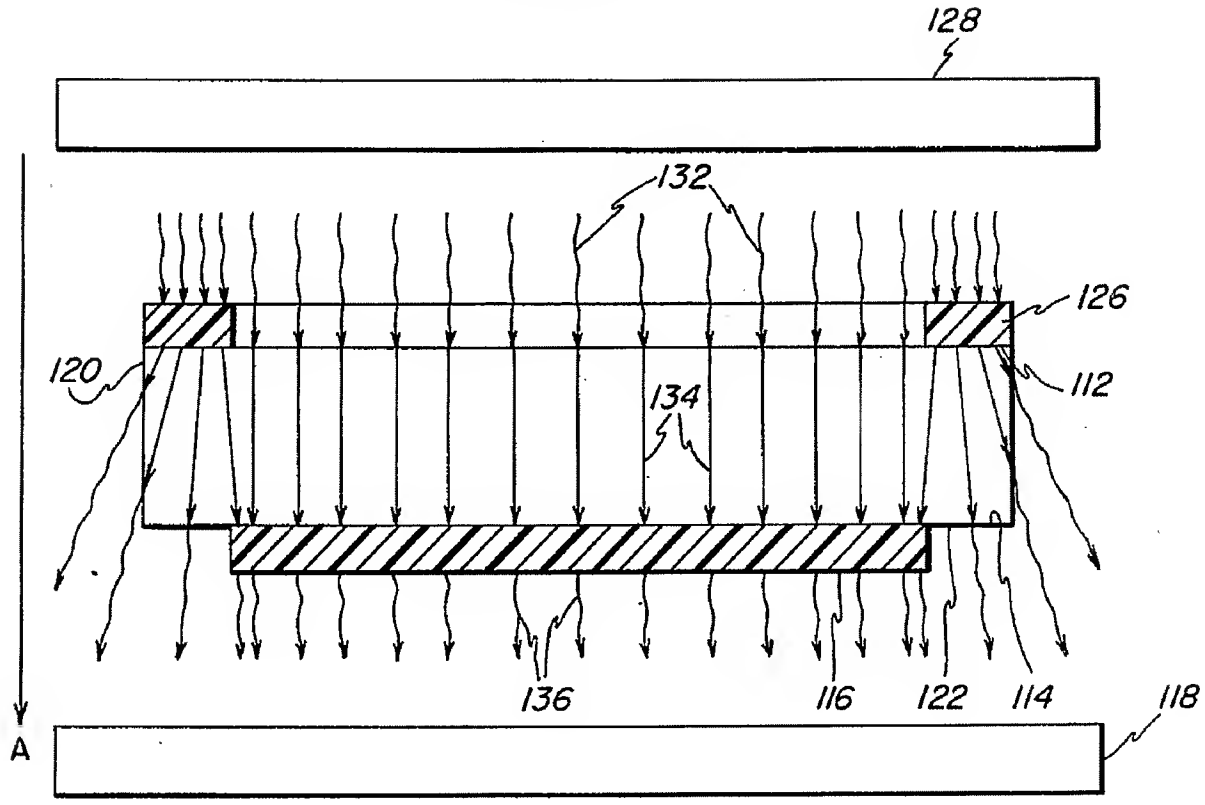
FIG. 5



This embodiment is more complex, because in addition to the non-infrared-transmitting semiconductor wafer 110, it also includes a ring shaped layer 126 (seen above in cross-section) located on top of the wafer; and a disc shaped layer 116 located under the wafer. Like the wafer layer, ***these other layers 116, 126 also transmit no infrared radiation.*** Because of the cross-hatching, the energy passing through each of these layers 116, 126 is not shown in Figure 5. However, the text of Anthony makes it clear that these layers absorb infrared radiation and convert it to heat. (See Anthony at col. 5, ll. 32-33 and col. 6, ll. 61-65.) In other words, all layers of the Figure 5 embodiment of Anthony are opaque with respect to infrared radiation and ***no layers 110, 116, 126 of Figure 5 Anthony transmit infrared radiation.***

C. Claims 11, 20 and 21

Claim 11 (as amended) recites the following: (i) "a first region comprising a material having a first non-zero transmittance;" (ii) "with the first non-zero transmittance being sufficiently large so that the infrared radiation transmitted is sufficient to etch plasma;" (iii) " a

second region comprising a material having second non-zero transmittance;" (iv) "with the second non-zero transmittance being sufficiently large so that the infrared radiation transmitted is sufficient to etch plasma." Claim 21 (as amended) includes similar claim language. Claim 20 (as amended) recites the following: "the transmission regions of the plurality of transmission regions have a transmittance sufficiently large to sufficiently transmit infrared radiation to etch plasma."

Anthony does not teach or suggest any of the above quoted portions of claim language because Anthony does not disclose any sort of transmittance of infrared radiation, as explained above. Anthony does not disclose infrared transmission "sufficient to etch plasma." Anthony does not even disclose "non-zero" infrared transmittance. All layers in Anthony are opaque with respect to infrared radiation. All layers in Anthony absorb all infrared radiation and convert this form of energy to heat, instead of transmitting it. For these reasons, claims 11-15 and 18-21 (as amended) are not anticipated by Anthony and are patentable over Anthony.

D. Claim 19

Claim 19 (as amended) further recites: "said first region is further adapted to select for selectively transmit a resonant frequency of infrared radiation; and said second region is further adapted to select for selectively transmit a resonant frequency of infrared radiation." This claim language is also not taught or suggested by Anthony. This is a further reason that claim 19 is patentable over Anthony.

Claim Rejections – Obviousness -- 35 USC § 103

The Current Office Action rejects claims 16-17 on 35 U.S.C. 103 obviousness grounds based on one or more of the following references: (i) Anthony ; and (ii) US patent 6,867,420 ("Mathies") (collectively the "Applied Art"). This rejection is respectfully traversed for similar reason to claim 11 (the base claim of claims 16 and 17. Specifically, Mathies does not disclose a filter for transmitting plasma-etching infrared radiation.

Conclusion

In view of the foregoing amendments and/or discussion, it is respectfully submitted that this application is ready for allowance. If the Examiner believes a telephone conference with Applicant's attorney would expedite prosecution of this application, please contact the undersigned at (315) 218-8116.

Respectfully submitted,

Dated: May 18, 2009 By: _____

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